



The Outlook for Nutraceuticals and Functional Foods

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ALMOND BOARD OF CALIFORNIA

Nutraceutical – An American term

**S. DeFelice MD, Foundation for Innovation
in Medicine**

A nutraceutical is a product isolated or purified from foods that is generally sold in medicinal forms not usually associated with food. A nutraceutical is demonstrated to have a physiological benefit or provide protection against chronic disease (Health Canada 1998).



There Is No Legal Definition For Functional Foods Anywhere in the World

Working Industry Definition:

“Foods that may provide a health benefit beyond basic nutrition”

(International Food Information Council)

- Traditional and whole foods**
- Processed +/-or fortified foods**



Why did “functional foods” develop?

East

Japan

1980-1995

- Health costs rising
- Population aging
- Food industry stagnant
- Relation between food and health well accepted by consumers and regulators
- FOSHU was created

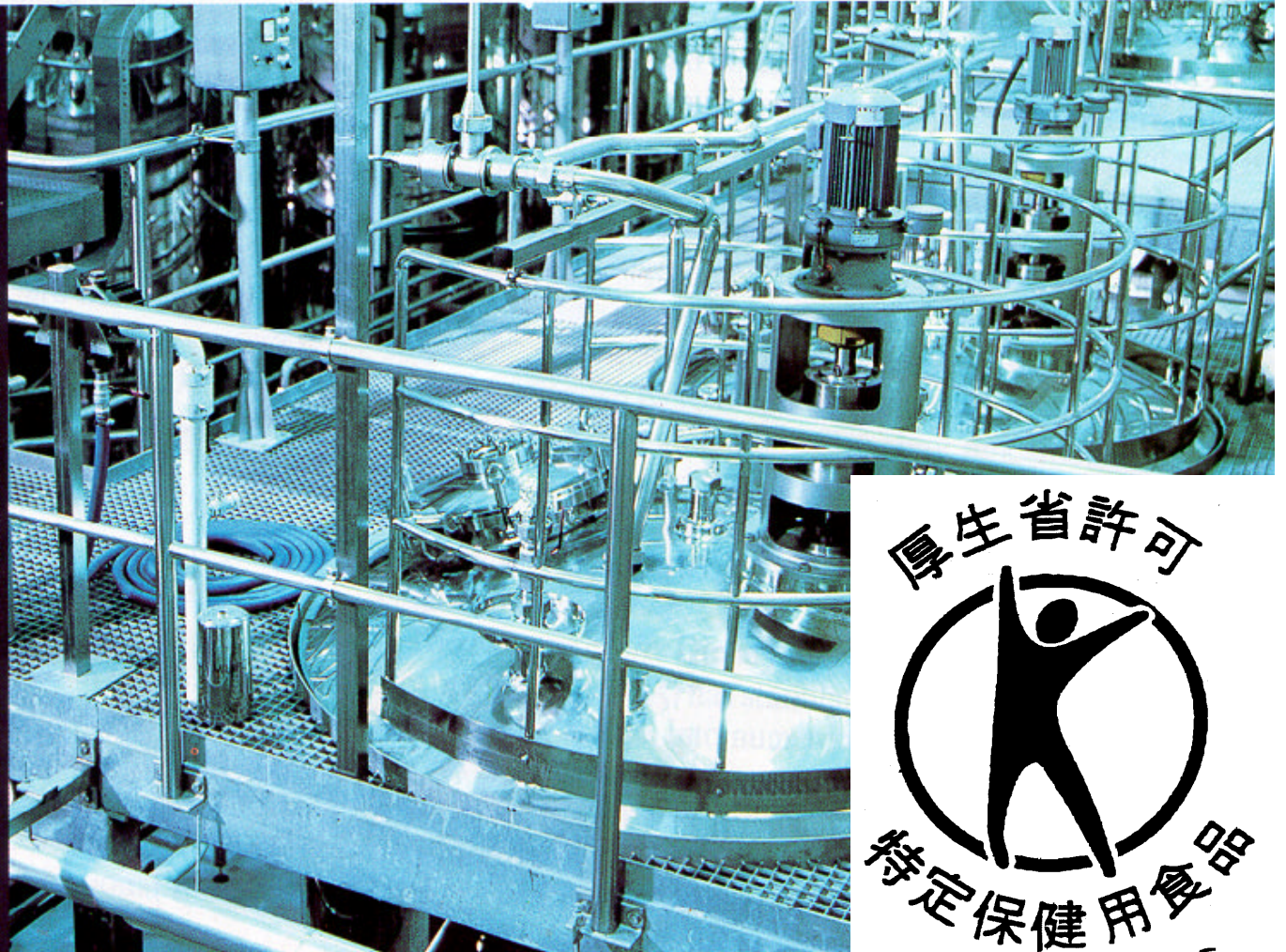
West

America

- Relation between food & health NOT well accepted by doctors or regulators
- Consumers demanded nutrition labelling for foods
- Self care movement
- Health claims allowed



World's Leading Functional Food - 27 million bottles/day



Japanese Functional Food Market

- 1920-30's development of bifidus drinks
- 1970's boom in sports drinks
- 1980-90's FOSHU System initiated

Total Functional Food Market = 8.0 billion \$US (1998)

FOSHU health claim products = 2.0 billion \$US (1999)

- Creative talents of food industry
- Adventurous nature of consumers
- Positive attitude of government





5.4 million
Vending
Machines in
Japan.....or
1 for every
23 people

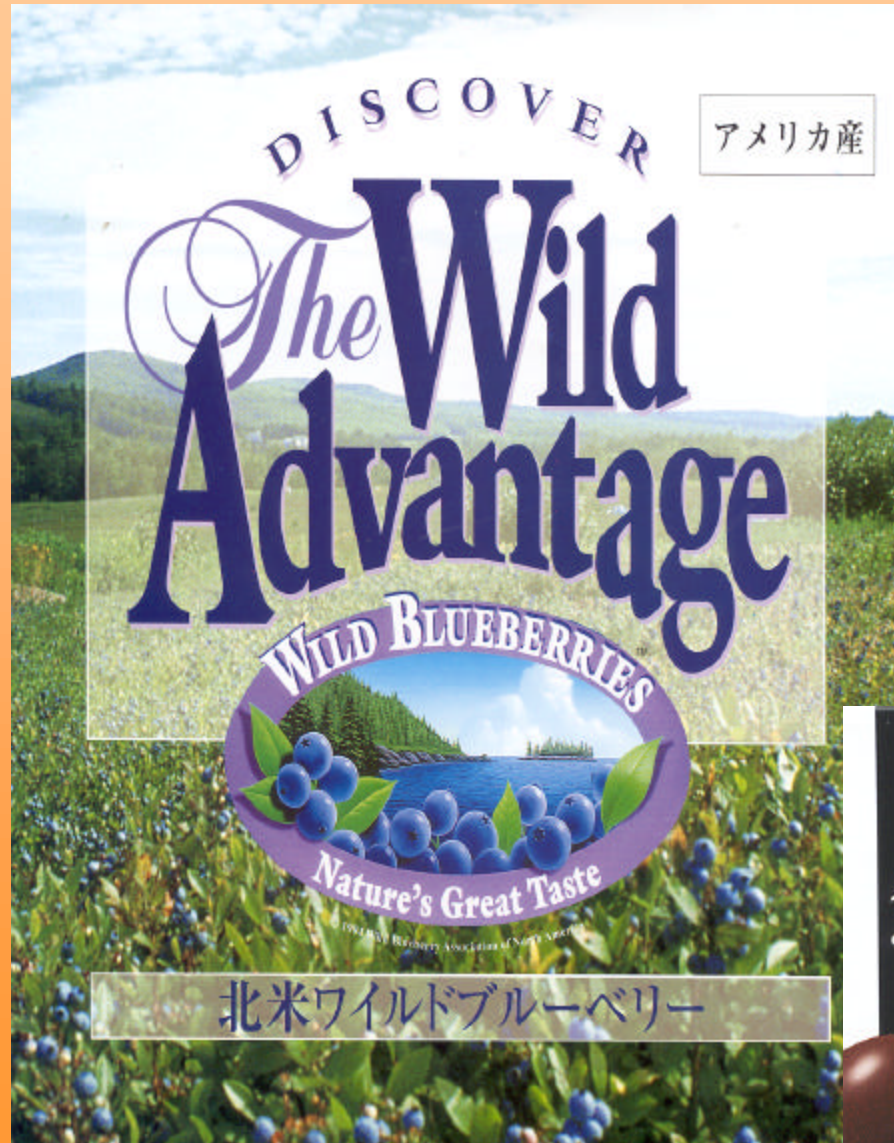


Italian Cuisine a Big Hit in Japan

Tomato Products & Lycopene Benefits Known



Antioxidant Health Benefits Well Known in Japan



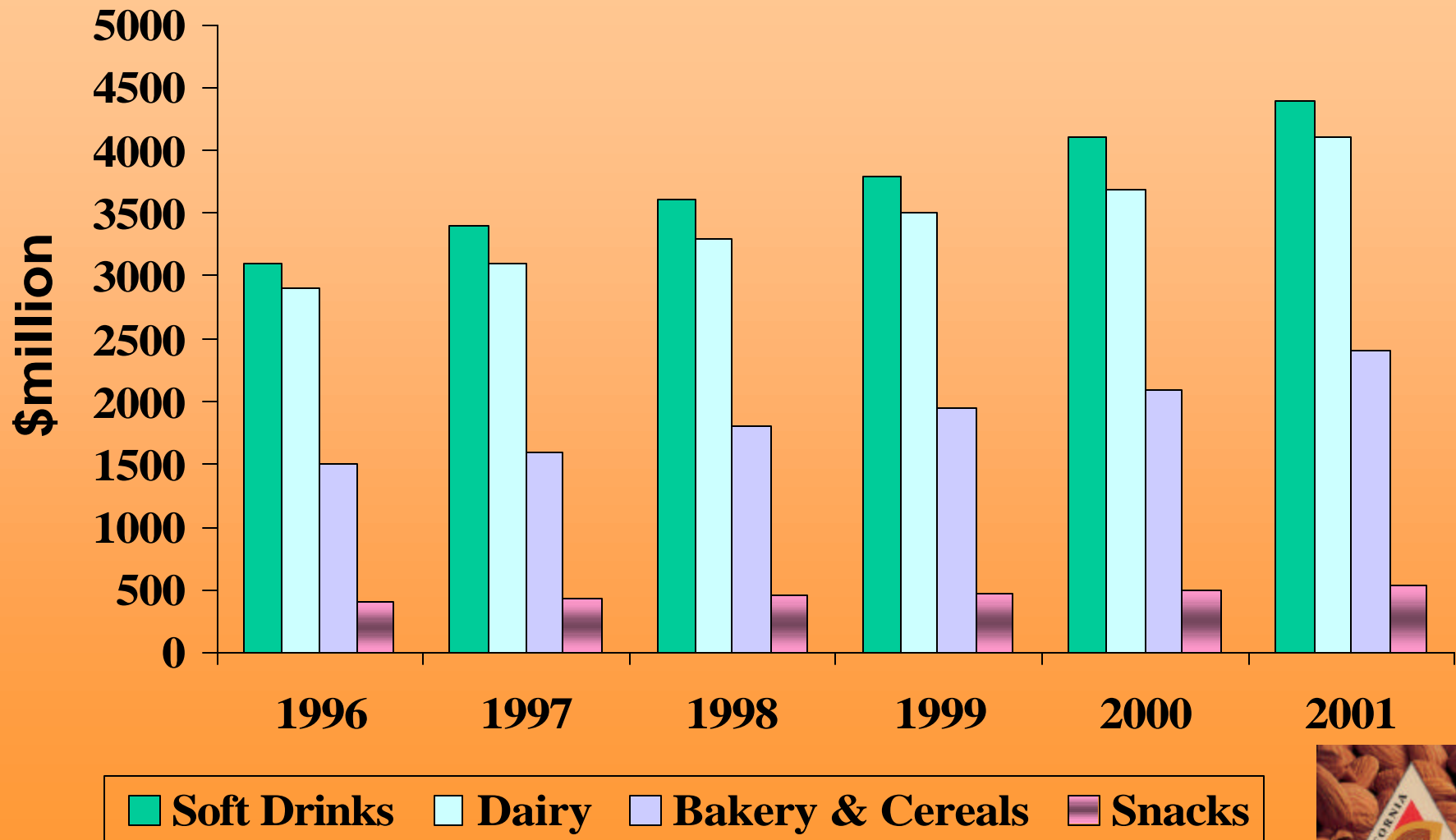
US Retail Food Sales (1998) and Growth by Category ('97-'98)

	Fruit and Vegetable	Beverages	Others	Total
Natural/org. Foods (\$bil)	1.6	1.5	5.7	8.8
'97-'98 Growth (%)	13.4	13.6		12.7
Functional Foods (\$bil)	0.0	4.9	9.9	14.8
'97-'98 Growth (%)	0.0	12.0		8.1
Lesser Evil Foods (\$bil)	0.3	17.3	25.7	43.3
'97-'98 Growth (%)	-0.1	0.4		1.9
Market Standard (\$bil)	76.7	54.7	254.7	386.1
'97-'98 Growth (%)	2.1	-1.2		1.7
TOTAL (\$bil)	78.6	78.4	296.0	453.0
'97-'98 Growth (%)	2.8	0.8		2.2

(Nutrition Business Journal, May 2000)



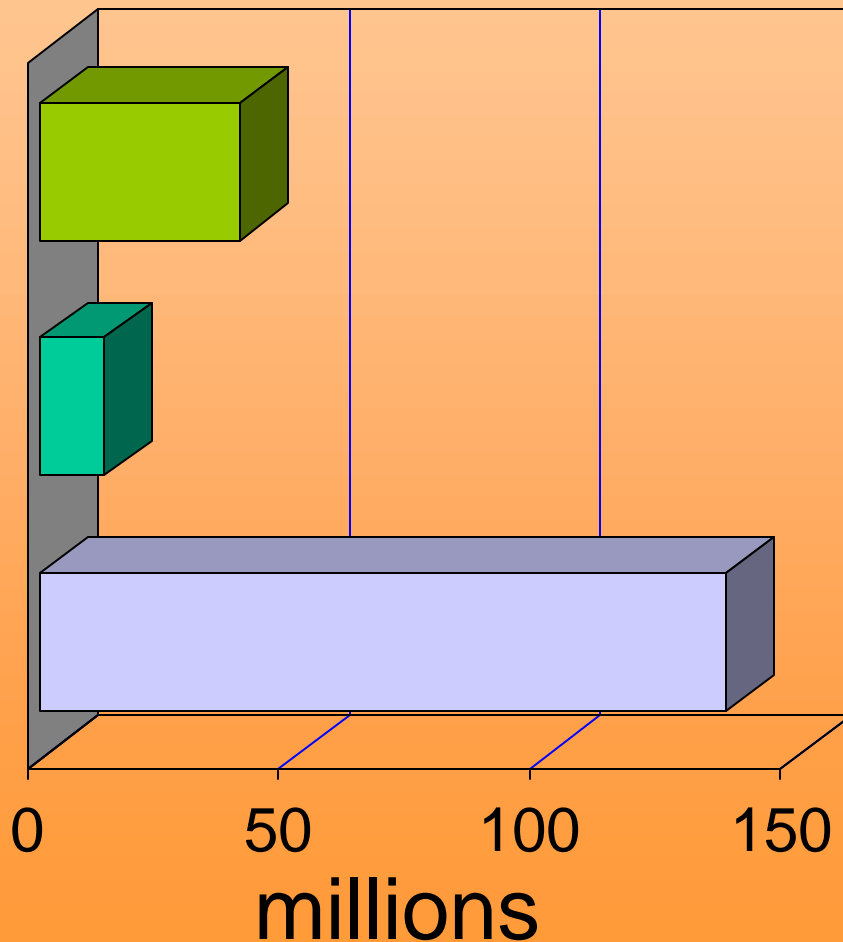
U.S. Functional Food Forecast by Market Sector, 1996-2001



Source: Datamonitor Americas



Public Health Awareness of American Consumers



HEALTH ACTIVE

Act today for the future

Eat fruit & exercise 2X/week

HEALTH AWARE

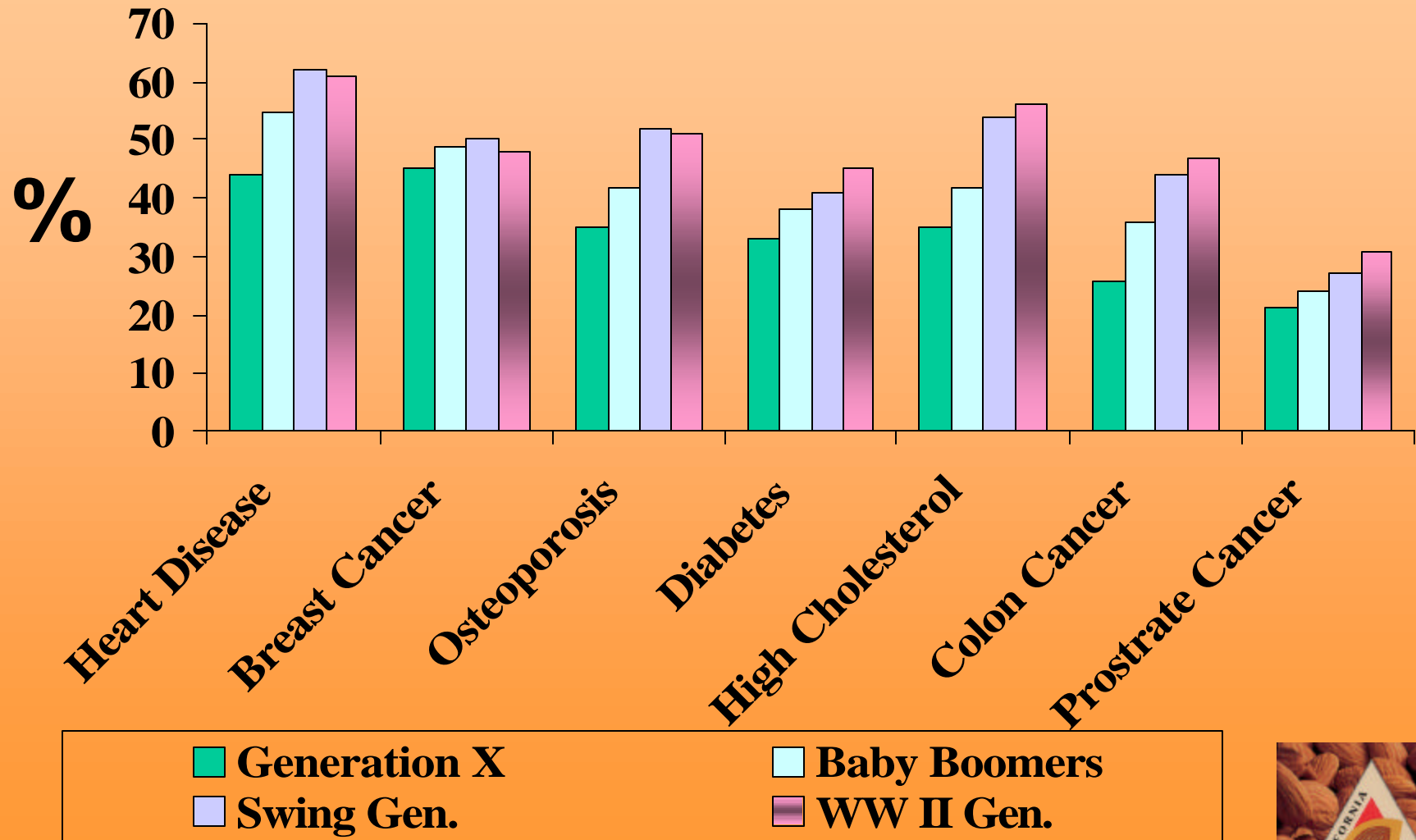
Eat fruit & DO NOT
exercise 2X/week

HEALTH UNINVOLVED

Reactive and resist change
Episodic



Health Concerns With Age



(HealthFocus, 1999 / Sloan, 2000)



What do all these new terms mean ?

PHYTOCHEMICAL :

- **plant chemicals which have no known function in human nutrition but seem to have a variety of biological effects**

ANTIOXIDANT :

- **compounds that help protect the body from the potentially harmful effects of free radicals, ie. Vitamin C & E, and flavonoids**



Choose Your Vegetables Wisely

	% Of Total Fruits & Veggies Consumed	% of U.S. Adults Consuming The Item
Lettuce, iceberg	8.0	42
Tomatoes, raw	7.5	39
French Fries	4.7	16
Bananas	4.6	24
Orange Juice	4.6	23
Onions	2.9	18
Apples	2.7	15
Carrots	2.3	14

J. Brody, NY Times, 2001

Phytochemical –Rich Foods

	% Of Total Fruits & Veggies Consumed	% of U.S. Adults Consuming The Item
Grapes	0.9	6
Strawberries	0.7	5
Grapefruit	0.6	5
Broccoli	0.4	3
Spinach	0.2	2
Kale	0	0



Major Phenolic Compounds (flavonoids) found in fruits

(*mg/100g FW*)

Fruit	Total Phenolics
White wine	8/100 ml
Red wine	215/100 ml
Strawberry	85
Blueberry	340
Cranberry	290
Banana	150
Apple	50-1100



Promising Phytochemicals in Produce (mg/kg FW)

Substance	Source	Level
Quercetin	onions	284- 486
Kaempferol	parsley	45
Myricetin	spinach	37
Ficetin	strawberry	160
Liminene	lemons	34
Alpha-tocopherol	almonds	260
Anthocyanins	red grapes	8 - 388
Lycopene	tomato	150



How Would You Like Your Antioxidants?

A diet rich in fresh fruits and vegetables has been shown to decrease the risk of chronic diseases such as heart disease and cancer.

Fruits and vegetables contain dietary antioxidants that fight free radicals—helping to maintain healthy cells and tissues in the body. If you are interested in consuming more antioxidants, choose a balanced diet that includes many types of antioxidant-containing foods and beverages, because different foods supply different kinds and amounts of antioxidants.

Fruits, vegetables and black and green tea contain a number of dietary antioxidants. Pictured are some common foods and beverages that contain antioxidants.

Flavonoids



Red Grapes



Lipton's Iced Tea
Lipton Black & Green Tea



Apples



Blueberries

Vitamin C



Orange Juice



Broccoli



Grapefruit



Red Peppers

Vitamin E



Nuts



Avocado



Oils



Olives

Carotenoids



Carrots



Brussels Sprouts



Tomatoes



Corn

Lipton
Tea & Health
Information Center

1.888.LIPTON.T
[1.888.547.8668]
www.LiptonT.com



Produce for Better Health
Foundation
1-302-235-ADAY
www.5aday.com

*Eat at least five servings of
fruits and vegetables a day.*



What is Food Synergy ?

Does the combination of almonds as the leading whole food source of natural Vitamin E with the Vitamin C and flavonoid rich vegetables result in increased antioxidant activity and potential anti-cancer effects ???

Attend the PBH 1st Int. Conference on Food Synergy May 10-11 in DC to find out more !



USA Levels of Health Claims (simplified)

- 1. Product contains X.**
- 2. X is good for you.**
- 3. X helps maintain a healthy body structure/ function.**
- 4. X reduces risk of a specific disease.**

P. Barton Hutt, 1999





QUAKER
OATMEAL SQUARES™

SOLUBLE FIBER FROM OATMEAL
AS PART OF A LOW SATURATED FAT, LOW CHOLESTEROL DIET

MAY REDUCE THE RISK OF HEART DISEASE

Nutrition Facts
Serving Size 1 cup (56g)
Servings Per Container about 8

Amount Per Serving	Cereal Alone	with 1/2 Cup Vitamin A&E Fortified Skim Milk
Calories	220	260
Calories from Fat	25	25
	% Daily Value**	% Daily Value**
Total Fat 2.5g*	4%	4%
Saturated Fat 0.5g	2%	2%
Polysaturated Fat 1g		
Monounsaturated Fat 1g		
Cholesterol 0mg	0%	0%
Sodium 260mg	11%	14%
Potassium 200mg	7%	12%
Total Carbohydrate 43g	14%	16%
Other Carbohydrate 30g		
Dietary Fiber 4g	17%	17%
Soluble Fiber 2g		
Inseal Fiber 2g		
Sugars 8g		
Protein 1g		
Vitamin A	10%	15%
Vitamin C	10%	10%
Calcium	2%	15%
Iron	90%	90%
Vitamin E	10%	10%
Thiamin	25%	30%
Riboflavin	25%	35%
Niacin	25%	25%
Vitamin B6	25%	30%
Folate	25%	25%



General Mills
Cheerios
Toasted Whole Grain Oat Cereal

LOW FAT

Great For Your Heart-Healthy Diet
See back for information about the relationship between a heart-healthy diet & heart disease.

WHOLE GRAIN OATS

American Heart Association
This product meets American Heart Association's dietary guidelines for healthy people over age 18 who eat as part of a balanced diet.

NET WT 10 OZ (283g)

1997 US - FDA First, Food-Specific, Generic, Health Claim



Structure/Function claim for Calcium



100% Juice

**FruitCal[®],
THE TYPE OF
CALCIUM USED IN
TROPICANA[®]
PURE PREMIUM[®],
IS A SUPERIOR SOURCE
OF CALCIUM THAT:**

- Is **absorbed better** than other calcium ingredients
- **Improves** bone strength
- Helps **maintain** bone density

350 MG PURE PREMIUM ORANGE PINEAPPLE CALCIUM 1 CUP	302 MG SKIM MILK 1 CUP
CALCIUM COUNT IN POPULAR FOODS	
AS MUCH CALCIUM AS MILK	

Nov. 2000 – FDA permitted Tropicana to make a health claim for pure orange juice based on potassium contentand reduced risk of high blood pressure & stroke



**ABSTRACT OF STUDY PRESENTED AT THE
71st SCIENTIFIC SESSION OF THE AMERICAN
HEART ASSOCIATION, NOVEMBER 10, 1998,
DALLAS, TX.**

**Purple Grape Juice Inhibits Platelet
Function and Increases Platelet-Derived
Nitric Oxide Release.**

R. Sauter, Georgetown University Medical Center; J.D. Folts, University of
Wisconsin-Madison; J.E. Freedman, Georgetown University Medical Center.
Circulation. 1999;1-585.

**Commercial Grape Juices Inhibit the In Vitro Oxidation
of Human Low-Density Lipoproteins.**

E.N. Frankel, C.A. Bosanek, A.S. Meyer, K. Silliman, L.L. Kirk. *Journal of Agricultural and
Food Chemistry*. 1998;46(3): 834-838.

**Purple Grape Juice Improves Endothelial Function
and Reduces the Susceptibility of LDL Cholesterol
to Oxidation in Patients With Coronary Heart Disease.***

J.H. Stein, J.G. Keevil, D.A. Wiebe, S. Aeschlimann, J.D. Folts. *Circulation*. 1999;100(10):1050-1055.

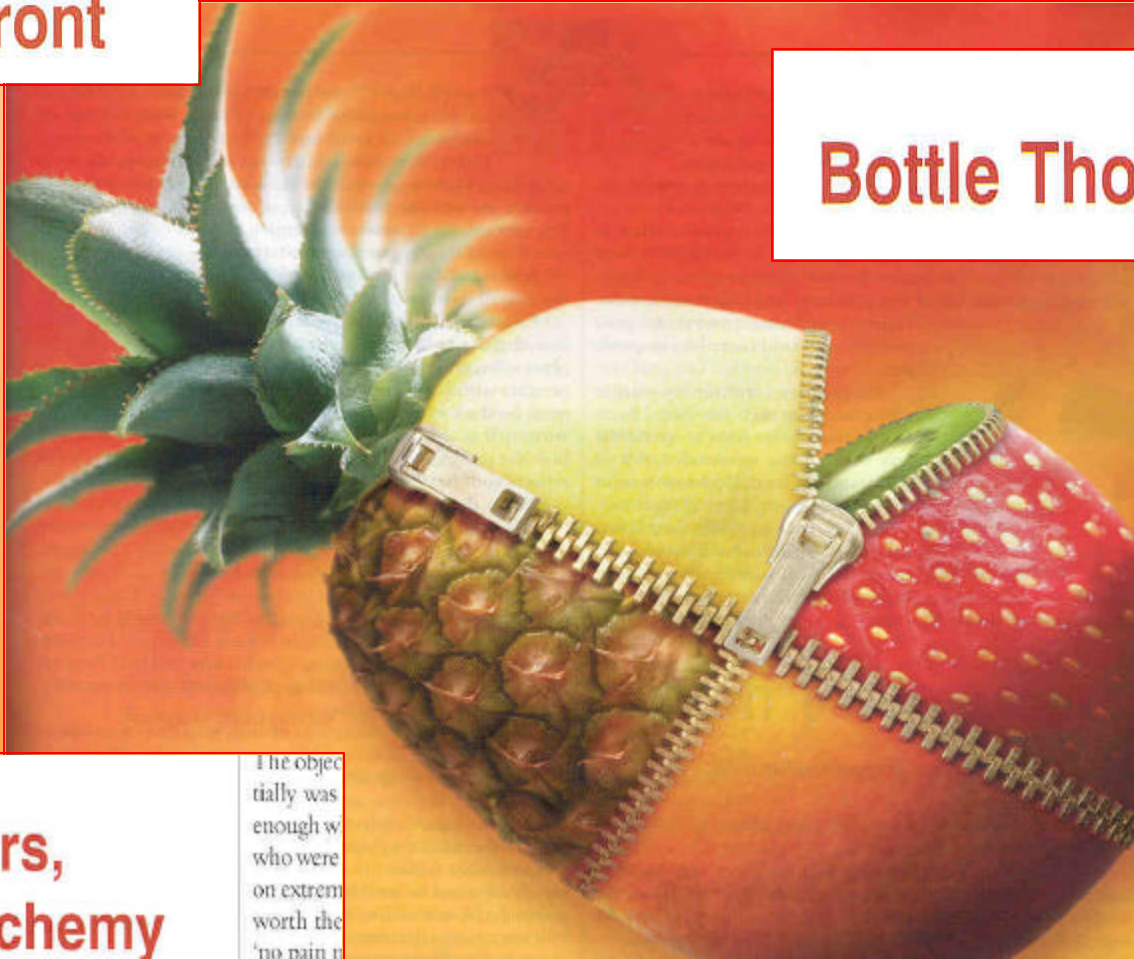
An Overview of Recent Research:
The Potential Cardiovascular Benefits of
Purple Grape Juice



Fruits & Flavor Fusion

Taste at the
Forefront

Bottle Those Trends



Flavours,
Today's Alchemy

The objec-
tially was
enough w
who were
on extrem
worth the
'no pain n
As fun



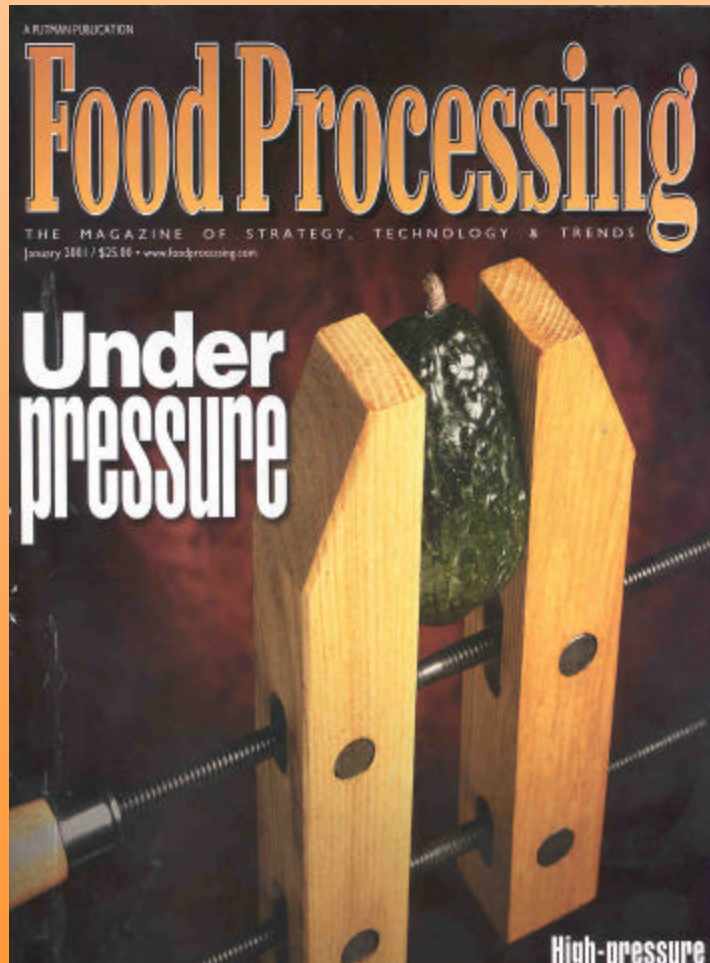
Americans versus Asians mycophobic or mycophilic?



*The magic
of mushrooms*

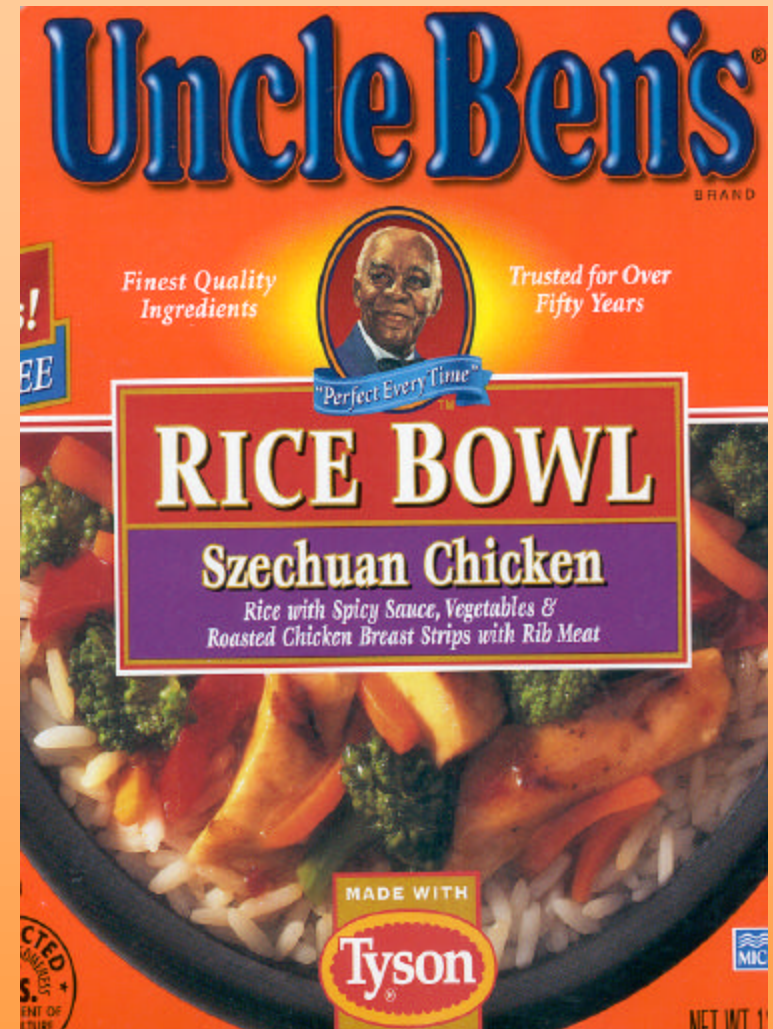


New Process for Better Quality & Safety



Quality under
Pressure

Healthy and Convenient



New Frontiers for Food and Health

A r t i c u l a t e d
U n a r t i c u l a t e d



Served

Unserved



Pathway to Move “Functional Food” Industry to Sustainable Growth

